Remarks:

Claim 1 has been amended to clarify that the percentage recited for the wax content is based on the silica present.

Claims 6 and 7 have been amended so that they recite the subject matter recited in those claims as originally filed.

Claims 20 and 34 have been amended to clarify the wax content mentioned with respect to claim 1.

Claims 32, 33, 40 and 41 have been amended to clarify that the coating recited therein is present on, i.e., "thereon," to the substrate. Applicants appreciate the Examiner's suggestion for this amendment, and that suggestion has been adopted.

Applicants request reconsideration and withdrawal of the rejections stated in the Office Action.

The specification has been objected to because the subject matter of original claim 2 does not have antecedent basis in the specification. Claim 2 recites a matting agent composition according to claim 1 wherein the wax content is about 18 to 22% by weight. Applicants have amended the specification on page 4 as indicated above and respectfully submit that this objection is no longer applicable and can be withdrawn.

Claim 41 has been rejected under 35 U.S.C. §112, first paragraph, because the specification does not enable one of ordinary skill in the art how to make a coating composition comprising an amine-modified polyether acrylate and any known matting agent component in an amount of about 12% by weight or less. Applicant, however, respectfully traverses.

It is submitted that the Patent and Trademark Office has to presume an applicant's disclosure is enabling absent some particular reason for doubting the operability and enablement of Applicant's disclosure. In the above-mentioned application, Applicants have described radiation curable compositions and coatings on page 7 of their application. Amine-modified acrylates are generally and specifically mentioned on the same page. A coating and amine-modified acrylate coating containing about 12% by weight matting agent or less is illustrated on page 9, and its performance is subsequently illustrated in the examples to show that one could obtain a gloss of about 70 gloss units or less at 60°. See page 11, Table 3. It is submitted that in light of the specific examples and the general description on page 7, that one of ordinary skill in the art is indeed enabled to practice the

entire breadth recited in 41. It is respectfully submitted the Patent Office has not presented any rationale or reason for doubting that enablement other than to state that it is not enabled. It is submitted the Patent Office has not met its burden and withdrawal of this rejection is requested.

Claims 1 – 10, 20 – 23, 25 and 27 – 41, are rejected under U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out the wax content recited. Applicants have again by amendment clarified that the wax content is based on the silica, which was previously recited as the "silica composition." It is respectfully submitted that one of ordinary skill in the art would know what is and what is not covered by the recitation "silica," and withdrawal of this rejection is requested.

Claims 6 and 7 have been amended to recite the originally claimed subject matter. Accordingly, the rejection of those claims under §112, is no longer applicable and should be withdrawn.

It is stated in the Office Action that claims 30, 34 and 38 are not clear because they contain the phrase "curable component comprises acrylate," and it is suggested the claim be amended to recite an "acrylate-containing compound." It is respectfully submitted that one of ordinary skill in the art would know what is and what is not covered by this claim, and an amendment is not necessary. In particular, those claims recite that the radiation curable component of the coating composition comprises acrylate. Acrylate is a known chemical functionality and is adequately described by Applicants' specification. Therefore, an acrylate-containing compound is already embraced by "a radiation curable component which comprises acrylate." Applicants accordingly do not have the burden of having to amend a claim that complies with §112, second paragraph, and Applicants respectfully requests reconsideration of this rejection.

It is stated in the Office Action that claims 29 and 37 should be amended to recite that the "curing initiator" be characterized as a "photo initiator." Applicants respectfully disagree. Applicants submit that one of ordinary skill in the art would know what is and what is not a curing initiator, of which a photo initiator is a part. Accordingly, it is respectfully submitted that these claims recite subject matter recognized by those skilled in the art and accordingly, Applicants do not have any burden to amend those claims.

Claims 32, 33, 40 and 41 have been amended to adopt the Examiner's suggestion to change "thereto" to "thereon" and Applicants respectfully request withdrawal of the §112 rejection of those claims.

It is stated that claims 31, 39, 40 and 41 are not clear in light of the phrase "prepared from a coating." As indicated in the Office Action, there can be a number of ways in which a coating is prepared. However, it is also respectfully submitted that one of ordinary skill in the art would know those processes, including polymerization, as indicated in the Office Action. Again, Applicants do not have the burden to amend a claim that already complies with §112, second paragraph, and Applicants request reconsideration of the rejection of the aforementioned claims.

Claims 1 – 10 have been rejected under 35 U.S.C. §102(b) as being anticipated by Aldcroft et al. These claims have been rejected based on combining two generic ranges described by Aldcroft with respect to particle sizes of silica matting agents and wax contents in the matting agents. In particular, it is stated in the Office Action that Aldcroft discloses a particle size between 5 and 9 microns and a wax content of from 5 to 20 wt.%. Applicants request reconsideration and withdrawal of this rejection. In addition to reciting a particle size of 2 to 12 microns for silica, Applicants' claims also recite a wax content from about 18 to 30 wt.% of the silica. It is clear that these ranges are not identical to those in Aldcroft. For example, Aldcroft does not disclose a matting agent having an average particle size of about 3 microns and wax content upwards of 30%. Therefore, regardless of whether Aldcroft discloses a range of particle sizes of wax coated silicas embracing a 5 micron particle as suggested in the Office Action, Aldcroft does not disclose a 5 micron particle size comprising wax in the range of 18 to 30%. Indeed, it is submitted Aldcroft's examples suggest wax contents below 10%.

As indicated *In re Petering,* 133 USPQ 275 (CCPA 1962) a prior art reference's generic teachings which encompass a vast number of combinations of properties and parameters which encompass specific embodiments of a patent applicants' invention does not describe a patent applicants' claimed invention within 35 U.S.C. §102(b). Accordingly, withdrawal of the §102(b) rejection of the aforementioned claims is requested.

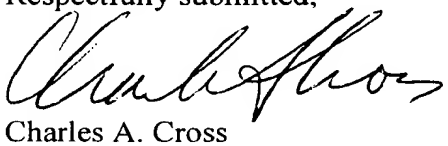
Claims 20 – 23, 25 and 27 – 40, are rejected under 35 U.S.C. §103(a) as being unpatentable over the '030 PCT patent application in view of Aldcroft et al.

Reconsideration and withdrawal of this rejection is requested. Briefly, it is respectfully submitted that the Patent Office has not presented a *prima facie* case of obviousness under §103. The '030 PCT application discloses a wax content in the range of 6 – 15 wt.%. Aldcroft goes no further in suggesting to one of ordinary skill to modify the wax content described in the '030 PCT application, because while Aldcroft teaches a wax content upwards of 20 wt.%, its illustrative examples contain wax in amounts of 10% or less. Accordingly, both references suggest away from matting agents containing 18% or more wax. Accordingly, it is erroneous to state in the Office Action that it would be obvious for one of ordinary skill in the art to employ a wax coated silica having a wax content of 18 – 20 wt.%.

It is well established that the prior art would need to provide motivation to employ that amount. Contrary to that stated in the Office Action, it is not seen where Aldcroft suggests an optimum matting effect is obtained by compositions containing 18% by weight wax. It is submitted that Aldcroft's mere mention that upwards of 20% wax can be used in no way counteracts Aldcroft's teaching in his preferred examples that one should employ smaller amounts. Accordingly, when one combines Aldcroft with the aforementioned PCT application's express statements that 6 – 15 wt.%, one of ordinary skill in the art would only be motivated to only go as high as 15% by weight. Accordingly, Applicants respectfully request the withdrawal of the above-mentioned §103 rejection based on the aforementioned two references.

In view of the above amendments and remarks, Applicant's respectfully submit that the above-mentioned patent application is now in condition for allowance. Applicants respectfully request notification to that effect in the form of a Notice of Allowability.

Respectfully submitted,



Charles A. Cross
Attorney for Applicant
Reg. No. 32,406

Tel: (410) 531-4518
W. R. Grace & Co.-Conn.
7500 Grace Drive
Columbia, Maryland 21044s

In summary, due to the fast curing of UV-systems and the difficulties of matting such systems, it has been a practice to choose a micronized matting agent with a mean particle size which is close to the thickness of the film after it cures. Accordingly, when one is using a particular coating, the matting agent that can be used is one that has a particle size close to the film thickness of the resulting coating.

It is therefore desirable to have a matting agent which is efficient in radiation curable coatings and can be used at relatively low levels so that viscosity of the formulation is not adversely affected. It is also desirable to have a matting agent that is efficient for fast and slow curing systems, thereby offering the user of the matting agent greater flexibility. In other words, it would be desirable to have available a matting agent that produces stable, reproducible low gloss coatings for a variety of coating formulations without the usual problems of unworkable viscosity increases, inconsistent gloss values at varying coating weight and avoids the use of special application techniques to reduce gloss. In addition, it is also desirable that the agent produces a consistent matting effect over a wide range of thicknesses.

SUMMARY OF THE INVENTION

The aforementioned objects are unexpectedly obtained by employing silica matting agents having a maximum pore volume of 1.4 ml/g and a wax content of at least 15% and maximum of 30 % by weight. The wax content typically is in the range of 18 to 22% by weight. The wax preferably has a melting point in the range of 60-120°C, and most preferably in the range of 60-90°C. The matting efficiency of the agent is also affected by the particle size of the invention. The invention has a median particle size in the range of 2.0-12.0 μm, with a preferred range of 2.0-5.0 μm. It is also unexpected that the matting agents having particles sizes in the lower part of above ranges can enhance matting efficiency further without significant adverse affects on the viscosity of the coating composition.

The wax coated silica-matting agents can be used with a variety of radiation curable compositions and can be manufactured by simultaneously melting and milling the wax and silica to the desired particle size. The milling process is preferably carried out in a fluid energy mill with an inlet temperature which is above the melting point of the used wax.

In summary, due to the fast curing of UV-systems and the difficulties of matting such systems, it has been a practice to choose a micronized matting agent with a mean particle size which is close to the thickness of the film after it cures. Accordingly, when one is using a particular coating, the matting agent that can be used is one that has a particle size close to the film thickness of the resulting coating.

It is therefore desirable to have a matting agent which is efficient in radiation curable coatings and can be used at relatively low levels so that viscosity of the formulation is not adversely affected. It is also desirable to have a matting agent that is efficient for fast and slow curing systems, thereby offering the user of the matting agent greater flexibility. In other words, it would be desirable to have available a matting agent that produces stable, reproducible low gloss coatings for a variety of coating formulations without the usual problems of unworkable viscosity increases, inconsistent gloss values at varying coating weight and avoids the use of special application techniques to reduce gloss. In addition, it is also desirable that the agent produces a consistent matting effect over a wide range of thicknesses.

SUMMARY OF THE INVENTION

The aforementioned objects are unexpectedly obtained by employing silica matting agents having a maximum pore volume of 1.4 ml/g and a wax content of at least 15% and maximum of 30 % by weight. The wax content typically is in the range of 18 to 22% by weight. The wax preferably has a melting point in the range of 60-120°C, and most preferably in the range of 60-90°C. The matting efficiency of the agent is also affected by the particle size of the invention. The invention has a median particle size in the range of 2.0-12.0 μm, with a preferred range of 2.0-5.0 μm. It is also unexpected that the matting agents having particles sizes in the lower part of above ranges can enhance matting efficiency further without significant adverse affects on the viscosity of the coating composition.

The wax coated silica-matting agents can be used with a variety of radiation curable compositions and can be manufactured by simultaneously melting and milling the wax and silica to the desired particle size. The milling process is preferably carried out in a fluid energy mill with an inlet temperature which is above the melting point of the used wax.

1. (Twice Amended) A matting agent composition comprising silica and wax wherein the composition has a median particle size in the range of 2 to about 6 microns, a wax content in the range of about 18 to 30% by weight of the ~~total~~ silica ~~composition~~ and the silica has a pore volume in the range of about 0.8 to 1.4 cc/g.

6. (Twice Amended) A matting agent composition according to claim 1 wherein the median particle size of the composition is 2 to ~~about 6~~5 microns.

7. (Twice Amended) A matting agent composition according to claim 2 wherein the median particle size of the composition is 2 to ~~about 6~~5 microns.

20. (Twice Amended) A coating composition comprising a radiation curable component and a matting agent component, the matting agent component having a median particle size in the range of 2-5 microns, a wax content in the range of about 18 to 30% by weight of the ~~total~~ silica ~~composition~~ and a silica having a pore volume in the range of about 0.8 to 1.4 cc/g.

32. (Twice Amended) A coated substrate comprising a substrate and a coating ~~thereto~~ thereon prepared from a composition of claim 30 and the coating has a gloss of about 20 gloss units or less at 60°.

33. (Once Amended) A coated substrate comprising a substrate and coating ~~thereto~~ thereon wherein the coating ~~comprises~~ amine-modified polyether acrylate and is prepared from a composition comprising about 12% by weight matting agent component or less and the coating has a matting efficiency of about 60 gloss units or less at 60°.

34. (Once Amended) A coating composition comprising a radiation curable component and a matting agent component, the matting agent component having a median particle size in the range of 2-12 microns, a wax

content in the range of about 15 to 30% by weight of the ~~total~~ silica ~~composition~~ and a silica having a pore volume in the range of about 0.8 to 1.4 cc/g. and wherein the radiation curable component comprises acrylate.

40. (Once Amended) A coated substrate comprising a substrate and a coating ~~thereto~~ thereon prepared from a composition of claim 34 and the coating has a gloss of about 20 gloss units or less at 60°.

41. (Once Amended) A coated substrate comprising a substrate and coating ~~thereto~~ thereon prepared from a coating which comprises amine-modified polyether acrylate and is prepared from a composition comprising about 12% by weight matting agent component or less and the coating has a gloss of about 70 gloss units or less at 60°.